

110TH CONGRESS  
2D SESSION

# S. 3274

To reauthorize the 21st Century Nanotechnology Research and Development Act, and for other purposes.

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## IN THE SENATE OF THE UNITED STATES

JULY 16, 2008

Mr. KERRY (for himself, Ms. SNOWE, Mr. INOUE, Mr. STEVENS, Mr. PRYOR, Mr. SMITH, and Mr. WYDEN) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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## A BILL

To reauthorize the 21st Century Nanotechnology Research and Development Act, and for other purposes.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “National  
5       Nanotechnology Initiative Amendments Act of 2008”.

6       (b) TABLE OF CONTENTS.—The table of contents for  
7       this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Enhancements to National Nanotechnology Program.
- Sec. 3. Enhancements to National Nanotechnology Program coordination.
- Sec. 4. Enhancement of National Nanotechnology Advisory Panel.
- Sec. 5. Triennial external review of National Nanotechnology Program.

- Sec. 6. Societal dimensions of nanotechnology.
- Sec. 7. Transfer of nanotechnology.
- Sec. 8. Research in areas of national importance.
- Sec. 9. Nanomanufacturing research.
- Sec. 10. Nanoscale characterization and metrology.
- Sec. 11. GAO study of nanotechnology related codes, standards, and regulations.
- Sec. 12. Public outreach.
- Sec. 13. Amendments to definitions.

1 **SEC. 2. ENHANCEMENTS TO NATIONAL NANOTECHNOLOGY**  
 2 **PROGRAM.**

3 (a) EXPANSION OF PROGRAM SCOPE.—Section 2(a)  
 4 of the 21st Century Nanotechnology Research and Devel-  
 5 opment Act (15 U.S.C. 7501(a)) is amended—

6 (1) in paragraph (2), by striking the “and” at  
 7 the end;

8 (2) in paragraph (3), by striking the period at  
 9 the end and inserting “; and”; and

10 (3) by adding at the end the following:

11 “(4) sponsor nanotechnology education and  
 12 workforce development programs to prepare sci-  
 13 entists, engineers, and technicians to work in  
 14 nanotechnology;

15 “(5) support the development of standard ref-  
 16 erence materials and instrumentation, metrology,  
 17 and computational tools necessary to measure, char-  
 18 acterize, and predict the properties of nanoscale ma-  
 19 terials;

20 “(6) participate in national and international  
 21 organizations developing trade, commercialization,

1 and regulatory guidelines, plans, and standards for  
2 the safe use of nanotechnology;

3 “(7) establish and sustain the infrastructure,  
4 tools, and instruments to provide cost effective state-  
5 of-the-art measurement, characterization, manipula-  
6 tion, and simulations capabilities; and

7 “(8) utilize the perspectives of the industrial  
8 community to promote the rapid commercial devel-  
9 opment of nanoscale-enabled devices, systems, and  
10 technologies.”.

11 (b) ADDITION OF PROGRAM ACTIVITIES.—

12 (1) IN GENERAL.—Section 2(b) of such Act (15  
13 U.S.C. 7501(b)) is amended—

14 (A) by redesignating paragraphs (3)  
15 through (11) as paragraphs (4) through (12),  
16 respectively; and

17 (B) by inserting after paragraph (2) the  
18 following:

19 “(3) issuing guidance each year to the agencies  
20 participating in the Program that—

21 “(A) prioritizes the Program’s research ini-  
22 tiatives;

23 “(B) documents the benefit of the research  
24 to the United States; and

1           “(C) describes a clear strategy for  
2           transitioning the research into commercial prod-  
3           ucts and technologies;”.

4           (2) CONFORMING AMENDMENTS.—(A) Section  
5           2(c) of such Act (15 U.S.C. 7501(c)) is amended—

6                 (i) in paragraph (7), by striking “stated in  
7                 subsection (b)(7)” and inserting “stated in sub-  
8                 section (b)(9)”; and

9                 (ii) in paragraph (10), by striking “pursu-  
10                ant to subsection (b)(10)(D)” and inserting  
11                “pursuant to subsection (b)(12)(D)”.

12           (B) Section 2(d) of such Act (15 U.S.C.  
13           7501(d)) is amended in paragraphs (1) and (2), by  
14           striking “pursuant to subsection (b)(10)” each place  
15           it occurs and inserting “pursuant to subsection  
16           (b)(12)”.

17           (C) Section 7(a)(1) of such Act (15 U.S.C.  
18           7506(a)(1)) is amended by striking “under section  
19           2(b)(7)” and inserting “under section 2(b)(9)”.

20           (c) ENHANCEMENT OF PROGRAM MANAGEMENT.—

21                 (1) TRIENNIAL STRATEGIC PLAN.—Section 2(c)  
22                 of such Act (15 U.S.C. 7501(c)) is amended by  
23                 striking paragraph (4) and inserting the following:

24                         “(4) develop, not later than 1 year after the  
25                         date of the enactment of the National

1 Nanotechnology Initiative Amendments Act of 2008,  
2 and update every 3 years thereafter, a strategic plan  
3 to guide the Program activities described under sub-  
4 section (b) that—

5 “(A) specifies—

6 “(i) near-term and long-term objec-  
7 tives for the Program;

8 “(ii) the anticipated time frame for  
9 achieving the near-term objectives; and

10 “(iii) the metrics to be used for as-  
11 sessing progress toward the objectives; and

12 “(B) describes—

13 “(i) how the Program will move re-  
14 sults out of the laboratory and into appli-  
15 cations for the benefit of society, including  
16 through cooperation and collaboration with  
17 nanotechnology research, development, and  
18 technology transition initiatives supported  
19 by the States;

20 “(ii) how the Program will encourage  
21 and support interdisciplinary research and  
22 development in nanotechnology; and

23 “(iii) proposed research in areas of  
24 national importance in accordance with the  
25 requirements of section 12;”.

1           (2) JOINT INTERAGENCY SOLICITATIONS.—

2       Such section 2(c) is further amended—

3                   (A) in paragraph (9), by striking “and” at  
4       the end;

5                   (B) by redesignating paragraph (10) as  
6       paragraph (11);

7                   (C) by inserting after paragraph (9) the  
8       following:

9           “(10) encourage joint interagency solicitation of  
10       grant applications in high-priority multi-disciplinary  
11       research areas, including—

12                   “(A) instrumentation and metrology equip-  
13       ment to detect, measure, and characterize  
14       nanomaterials;

15                   “(B) chemical, biological, and nuclear sen-  
16       sor technology for defense and homeland secu-  
17       rity applications;

18                   “(C) sustainable energy, environment,  
19       water and agriculture;

20                   “(D) simulation and modeling; and

21                   “(E) manufacturing of complex systems at  
22       the nanoscale.”; and

23                   (D) in paragraph (11), as redesignated by  
24       subparagraph (B), by striking “through (9)”  
25       and inserting “through (10)”.

1 (d) EXPANSION OF ANNUAL REPORT OF THE NA-  
 2 TIONAL SCIENCE AND TECHNOLOGY COUNCIL.—Section  
 3 2(d) of such Act (15 U.S.C. 7501(d)) is amended—

4 (1) in paragraph (1), by inserting “and the pre-  
 5 vious fiscal year” after “current fiscal year”;

6 (2) in paragraph (4), by striking “and”;

7 (3) in paragraph (5), by striking the period at  
 8 the end and inserting “; and”; and

9 (4) by adding at the end the following:

10 “(6) the research plan required by section  
 11 10(b)(1) and updated under section 10(b)(5); and

12 “(7) a description of research and development  
 13 areas supported in accordance with section 12, in-  
 14 cluding—

15 “(A) the budget for such areas for the cur-  
 16 rent and previous fiscal year; and

17 “(B) the budget for such areas for the  
 18 next fiscal year.”.

19 (e) SUPPORT OF STANDARDS SETTING ACTIVI-  
 20 TIES.—Section 2 of such Act (15 U.S.C. 7501) is amend-  
 21 ed by adding at the end the following:

22 “(e) STANDARDS SETTING.—

23 “(1) IN GENERAL.—The agencies participating  
 24 in the Program shall support the activities of the

1 committees of standards setting bodies involved in  
 2 the development of standards for nanotechnology.

3 “(2) REIMBURSEMENT OF TRAVEL COSTS.—

4 The agencies participating in the Program may re-  
 5 imburse the travel costs of scientists and engineers  
 6 who participate in the activities described in para-  
 7 graph (1).”;

8 **SEC. 3. ENHANCEMENTS TO NATIONAL NANOTECHNOLOGY**  
 9 **PROGRAM COORDINATION.**

10 (a) MODIFICATIONS TO FUNDING OF NATIONAL  
 11 NANOTECHNOLOGY COORDINATION OFFICE.—Section  
 12 3(b) of the 21st Century Nanotechnology Research and  
 13 Development Act (15 U.S.C. 7502(b)) is amended to read  
 14 as follows:

15 “(b) FUNDING.—The operation of the National  
 16 Nanotechnology Coordination Office shall be supported by  
 17 funds from each agency participating in the Program. The  
 18 portion of the total budget of the Office provided by each  
 19 agency for each fiscal year shall be in the same proportion  
 20 as the agency’s share of the total budget for the Program  
 21 for the previous fiscal year, as specified in the report re-  
 22 quired under section 2(d)(1).”.

23 (b) ANNUAL REPORT ON FUNDING OF THE NA-  
 24 TIONAL NANOTECHNOLOGY COORDINATION OFFICE.—



1 Section 3 of such Act (15 U.S.C. 7502) is amended by  
2 striking subsection (c) and inserting the following:

3 “(c) ANNUAL REPORT.—The Council shall submit to  
4 the Committee on Commerce, Science, and Transportation  
5 of the Senate and the Committee on Science and Tech-  
6 nology of the House of Representatives each year, together  
7 with documents submitted to Congress in support of the  
8 budget of the President for the fiscal year beginning in  
9 such year (as submitted pursuant to section 1105 of title  
10 31, United States Code), a report containing the following:

11 “(1) A description of the funding required by  
12 the National Nanotechnology Coordination Office to  
13 perform the functions specified in subsection (a) for  
14 the next fiscal year set forth by category of activity,  
15 including the funding required to carry out the re-  
16 quirements of—

17 “(A) section 2(b)(12)(D);

18 “(B) subsection (d) of this section; and

19 “(C) section 5.

20 “(2) A description of the funding required by  
21 such Office to perform the functions specified in  
22 subsection (a) for the current fiscal year set forth by  
23 category of activity, including the funding required  
24 to carry out the requirements of subsection (d).

1           “(3) The amount of funding provided for such  
 2           Office for the current fiscal year set forth by each  
 3           agency participating in the Program.”.

4           (c) PUBLIC INFORMATION.—Such section is further  
 5 amended by adding at the end the following:

6           “(d) PUBLIC INFORMATION.—

7                 “(1) DATABASE.—

8                         “(A) IN GENERAL.—The Director of the  
 9                         National Nanotechnology Coordination Office  
 10                        shall develop and maintain a database of  
 11                        projects funded under any of the following:

12                                 “(i) The Environmental, Health, and  
 13                                 Safety program component areas.

14                                 “(ii) The Education and Societal Di-  
 15                                 mensions program component areas.

16                                 “(iii) The Nanomanufacturing pro-  
 17                                 gram component areas.

18                                 “(iv) Any successor program compo-  
 19                                 nent areas.

20                         “(B) DATABASE CONTENTS.—The data-  
 21                         base required by subparagraph (A) shall include  
 22                         the following, with respect to each project in the  
 23                         database:

24                                 “(i) A description of the project.

1                   “(ii) The source of funding of the  
2                   project, set forth by agency.

3                   “(iii) The funding history of the  
4                   project.

5                   “(C) GROUPING OF PROJECTS IN THE EN-  
6                   VIRONMENTAL, HEALTH, AND SAFETY PROGRAM  
7                   COMPONENT AREA.—For projects in the Envi-  
8                   ronmental, Health, and Safety program compo-  
9                   nent area, or any successor program component  
10                  area, projects shall be grouped in the database  
11                  by major objective as specified in the research  
12                  plan required by section 10(b)(1).

13                  “(D) GROUPING OF PROJECTS IN THE  
14                  EDUCATION AND SOCIETAL DIMENSIONS PRO-  
15                  GRAM COMPONENT AREA.—For projects in the  
16                  Education and Societal Dimensions program  
17                  component area, or any successor program com-  
18                  ponent area, the projects shall be grouped in  
19                  the database in the following categories:

20                         “(i) Education in formal settings.

21                         “(ii) Education in informal settings.

22                         “(iii) Public outreach.

23                         “(iv) Ethical, legal, and other societal  
24                         issues.

1           “(E) ACCESSIBILITY.—The Director shall  
 2           make the database required by subparagraph  
 3           (A) accessible to the public.

4           “(2) INFORMATION ON NANOTECHNOLOGY FA-  
 5           CILITIES.—

6           “(A) IN GENERAL.—The Director of the  
 7           National Nanotechnology Coordination Office—

8                   “(i) shall develop, maintain, and pub-  
 9                   licize information on nanotechnology facili-  
 10                  ties supported under the Program that are  
 11                  accessible for use by individuals from aca-  
 12                  demic institutions and from industry; and

13                   “(ii) may include information on  
 14                  nanotechnology facilities that are—

15                           “(I) supported by the States; and

16                           “(II) accessible for use by indi-  
 17                  viduals from academic institutions  
 18                  and from industry.

19           “(B) INFORMATION TO BE PUBLICIZED.—

20           The information developed, maintained, and  
 21           publicized under subparagraph (A) shall include  
 22           the following:

23                   “(i) The terms and conditions for the  
 24                  use of each nanotechnology facility sup-  
 25                  ported under the Program.

1 “(ii) A description of the capabilities  
2 of the instruments and equipment available  
3 for use at the facility.

4 “(iii) A description of the technical  
5 support available to assist users of the fa-  
6 cility.”.

7 **SEC. 4. ENHANCEMENT OF NATIONAL NANOTECHNOLOGY**  
8 **ADVISORY PANEL.**

9 (a) ESTABLISHMENT OF SUBPANEL ON SOCIETAL,  
10 ETHICAL, LEGAL, ENVIRONMENTAL, AND WORKFORCE  
11 CONCERNS.—Section 4(a) of the 21st Century  
12 Nanotechnology Research and Development Act (15  
13 U.S.C. 7503(a)) is amended—

14 (1) by striking “or designate”;

15 (2) by inserting “as a distinct entity” after  
16 “Advisory Panel”; and

17 (3) by inserting “(1) ESTABLISHMENT OF ADVI-  
18 SORY PANEL.—” before “The President shall” and  
19 indenting paragraph (1) as so designated 2 ems to  
20 the right; and

21 (4) by adding at the end the following:

22 “(2) ESTABLISHMENT OF SUBPANEL ON SOCI-  
23 ETAL, ETHICAL, LEGAL, ENVIRONMENTAL, AND  
24 WORKFORCE CONCERNS.—The Advisory Panel shall  
25 establish a subpanel with membership having spe-

1       cific qualifications tailored to enable it to carry out  
2       the requirements of subsection (c)(7).”.

3       (b) REPRESENTATION OF MINORITY-SERVING INSTI-  
4 TUTIONS.—Section 4(b) of such Act (15 U.S.C. 7503(b))  
5 is amended—

6           (1) by designating the first, second, and third  
7       sentences as paragraphs (1), (2), and (3), respec-  
8       tively, and indenting such paragraphs, as so des-  
9       ignated, 2 ems to the right;

10          (2) in paragraph (1), as so designated by para-  
11 graph (1) of this subsection—

12           (A) by striking “or designated”; and

13           (B) by inserting “MEMBERSHIP FROM ACA-  
14 DEMIC INSTITUTIONS AND INDUSTRY.—” before  
15 “The Advisory Panel”;

16          (3) in paragraph (2), as so designated by para-  
17 graph (1) of this subsection, by inserting “QUALI-  
18 FIED TO PROVIDE ADVICE.—” before “Members of”;

19          (4) in paragraph (3), as so designated by para-  
20 graph (1) of this subsection—

21           (A) by striking “or designating”; and

22           (B) by inserting “SEEKING RECOMMENDA-  
23 TIONS.—” before “In selecting”; and

24          (5) by adding at the end the following:

1           “(4) REPRESENTATION OF MINORITY-SERVING  
2           INSTITUTIONS.—At least one member of the Advi-  
3           sory Panel shall be an individual employed by and  
4           representing a minority-serving institution.”.

5 **SEC. 5. TRIENNIAL EXTERNAL REVIEW OF NATIONAL**  
6 **NANOTECHNOLOGY PROGRAM.**

7           Section 5 of the 21st Century Nanotechnology Re-  
8           search and Development Act (15 U.S.C. 7504) is amended  
9           to read as follows:

10 **“SEC. 5. TRIENNIAL EXTERNAL REVIEW OF THE NATIONAL**  
11 **NANOTECHNOLOGY PROGRAM.**

12           “(a) IN GENERAL.—The Director of the National  
13           Nanotechnology Coordination Office established under  
14           section 3(a) shall enter into an arrangement with the Na-  
15           tional Research Council of the National Academy of  
16           Sciences to conduct a triennial review of the Program. The  
17           Director shall ensure that each triennial review is carried  
18           out and concluded in such a manner as to allow sufficient  
19           time for the reporting requirements of subsection (c) to  
20           be satisfied.

21           “(b) MATTERS EVALUATED.—Each triennial review  
22           conducted under subsection (a) shall include an evaluation  
23           of the following:

24                   “(1) The research priorities and technical con-  
25           tent of the Program, including whether the alloca-

1       tion of funding among program component areas, as  
2       designated according to section 2(c)(2), is appro-  
3       priate.

4           “(2) The effectiveness of the Program’s man-  
5       agement and coordination across agencies and dis-  
6       ciplines, including an assessment of the effectiveness  
7       of the National Nanotechnology Coordination Office.

8           “(3) The scientific and technological accom-  
9       plishments of the Program and the success of the  
10      Program in transferring technology to the private  
11      sector.

12          “(4) The adequacy of the activities of the Pro-  
13      gram in addressing ethical, legal, environmental, and  
14      other appropriate societal concerns, including human  
15      health concerns.

16          “(5) The worldwide investment in and activities  
17      related to nanotechnology and an analysis of the rel-  
18      ative position of the United States compared to  
19      other countries with respect to nanotechnology re-  
20      search and development.

21      “(c) TRIENNIAL REPORTS.—

22          “(1) IN GENERAL.—Not later than September  
23      30, 2009, and every 3 years thereafter, the Director  
24      of the National Nanotechnology Coordination Office  
25      shall submit to the Advisory Panel, the Committee



1 on Commerce, Science, and Transportation of the  
 2 Senate, and the Committee on Science and Tech-  
 3 nology of the House of Representatives a report pre-  
 4 pared by the National Research Council on the most  
 5 recent triennial review carried out under subsection  
 6 (a).

7 “(2) CONTENTS.—Each report required by  
 8 paragraph (1) shall include the following:

9 “(A) The findings of the National Re-  
 10 search Council with respect to the matters de-  
 11 scribed in subsection (b).

12 “(B) The recommendations of the Director  
 13 of the National Nanotechnology Coordination  
 14 Office, if any—

15 “(i) on ways to improve the manage-  
 16 ment and coordination processes of the  
 17 Program; and

18 “(ii) for changes to the objectives,  
 19 funding priorities, and technical content of  
 20 the Program.

21 “(d) FUNDING.—Of the amounts provided in accord-  
 22 ance with section 3(b), the following amounts shall be  
 23 available to carry out this section:

24 “(1) \$500,000 for fiscal year 2009.

25 “(2) \$500,000 for fiscal year 2010.

1 “(3) \$500,000 for fiscal year 2011.”.

2 **SEC. 6. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.**

3 (a) IN GENERAL.—The 21st Century  
4 Nanotechnology Research and Development Act (15  
5 U.S.C. 7501 et seq.) is amended—

6 (1) by redesignating section 10 as section 15;

7 (2) by inserting after section 9 the following:

8 **“SEC. 10. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.**

9 “(a) COORDINATOR FOR SOCIETAL DIMENSIONS OF  
10 NANOTECHNOLOGY.—

11 “(1) DESIGNATION.—The Director of the Office  
12 of Science and Technology Policy shall designate an  
13 associate director of the Office of Science and Tech-  
14 nology Policy as the Coordinator for Societal Dimen-  
15 sions of Nanotechnology.

16 “(2) DUTIES.—The duties of the Coordinator  
17 for Societal Dimensions of Nanotechnology are as  
18 follows:

19 “(A) Providing oversight of the coordina-  
20 tion, planning, and budget prioritization of ac-  
21 tivities required by section 2(b)(12).

22 “(B) With the assistance of appropriate  
23 senior officials of the agencies funding activities  
24 within the Environmental, Health, and Safety  
25 program component area and the Education

1 and Societal Dimensions program component  
2 area, or any successor program component  
3 areas, ensuring that the requirements of section  
4 2(b)(12) are satisfied.

5 “(C) Ensuring that the research plan re-  
6 quired under subsection (b)(1) is—

7 “(i) developed, updated, and imple-  
8 mented as required thereunder; and

9 “(ii) responsive to the recommenda-  
10 tions of the subpanel established under  
11 section 4(a)(2).

12 “(D) Encouraging and monitoring the ef-  
13 forts of the agencies participating in the Pro-  
14 gram to allocate the level of resources and man-  
15 agement attention necessary to ensure that the  
16 ethical, legal, environmental, and other appro-  
17 priate societal concerns related to  
18 nanotechnology, including human health and  
19 workplace safety concerns, are addressed under  
20 the Program, including the implementation of  
21 the research plan required under subsection  
22 (b)(1).

23 “(E) Encouraging the agencies required to  
24 develop the research plan under subsection (b)  
25 to identify, assess, and implement suitable

1 mechanisms for the establishment of public-pri-  
 2 vate partnerships for support of environmental,  
 3 health, and safety research.

4 “(b) RESEARCH PLAN.—

5 “(1) IN GENERAL.—

6 “(A) PANEL CONVENED AND PLAN RE-  
 7 QUIRED.—Not later than 60 days after the date  
 8 of the enactment of this section, the Coordi-  
 9 nator for Societal Dimensions of  
 10 Nanotechnology designated under subsection  
 11 (a)(1) shall convene and chair a panel to de-  
 12 velop, periodically update, and coordinate the  
 13 implementation of a research plan for the Envi-  
 14 ronmental, Health, and Safety program compo-  
 15 nent area, or any successor program component  
 16 area.

17 “(B) MEMBERSHIP.—The panel convened  
 18 under subparagraph (A) shall be comprised of  
 19 representatives from—

20 “(i) the agencies funding research ac-  
 21 tivities under the program component area  
 22 described in such subparagraph; and

23 “(ii) such other agencies as the Coor-  
 24 dinator considers necessary.

1           “(C) SOLICITATION OF ADVICE.—In devel-  
2           oping and updating the plan required by sub-  
3           paragraph (A), the panel convened under such  
4           subparagraph shall solicit and be responsive to  
5           recommendations and advice from—

6                   “(i) the subpanel established under  
7                   section 4(a)(2); and

8                   “(ii) the agencies responsible for envi-  
9                   ronmental, health, and safety regulations  
10                  associated with the production, use, and  
11                  disposal of nanoscale materials and prod-  
12                  ucts.

13           “(2) DEVELOPMENT OF STANDARDS.—The plan  
14           required by paragraph (1) shall include a description  
15           of how the Program will help to ensure the develop-  
16           ment of the following:

17                   “(A) Standards related to nomenclature  
18                   associated with engineered nanoscale materials.

19                   “(B) Engineered nanoscale standard ref-  
20                   erence materials for environmental, health, and  
21                   safety testing.

22                   “(C) Instruments required to fill major  
23                   gaps in metrology capabilities.

24                   “(D) Standards related to methods and  
25                   procedures for detecting, measuring, moni-

1           toring, sampling, and testing engineered  
2           nanoscale materials for environmental, health,  
3           and safety impacts.

4           “(3) COMPONENTS OF PLAN.—The plan re-  
5           quired under paragraph (1) shall—

6                   “(A) specify near-term research objectives  
7                   and long-term research objectives;

8                   “(B) specify milestones associated with  
9                   each near-term objective and the estimated time  
10                  and resources required to reach each milestone;

11                  “(C) with respect to subparagraphs (A)  
12                  and (B), describe the role of each agency car-  
13                  rying out or sponsoring research in order to  
14                  meet the objectives specified under subpara-  
15                  graph (A) and to achieve the milestones speci-  
16                  fied under subparagraph (B);

17                  “(D) specify the funding allocated to each  
18                  major objective of the plan and the source of  
19                  funding by agency for the current fiscal year;  
20                  and

21                  “(E) estimate the funding required for  
22                  each major objective of the plan and the source  
23                  of funding by agency for the following 3 fiscal  
24                  years.

1           “(4) INCORPORATION OF RECOMMENDATIONS  
2           OF ADVISORY PANEL.—The Coordinator for Societal  
3           Dimensions of Nanotechnology designated under  
4           subsection (a)(1) and the panel convened under  
5           paragraph (1)(A) of this subsection shall incorporate  
6           any recommendations of the Advisory panel under  
7           subsection (g)(2) into the planning activity required  
8           under this subsection and provide the Committee on  
9           Commerce, Science, and Transportation of the Sen-  
10          ate and the Committee on Science and Technology  
11          of the House of Representatives justification should  
12          the funding in the research plan not meet such rec-  
13          ommendations.

14          “(5) SUBMITTAL OF INITIAL PLAN TO CON-  
15          GRESS.—Not later than 180 days after the date of  
16          the enactment of this section, the Coordinator for  
17          Societal Dimensions of Nanotechnology designated  
18          under subsection (a)(1) shall submit to the Com-  
19          mittee on Commerce, Science, and Transportation of  
20          the Senate and the Committee on Science and Tech-  
21          nology of the House of Representatives the initial  
22          plan required by paragraph (1).

23          “(6) ANNUAL UPDATE OF PLAN.—Each year,  
24          the panel convened under paragraph (1) shall update  
25          the plan required under such paragraph and submit

1 the plan to the Council for inclusion in the annual  
 2 report of the Council required by section 2(d).

3 “(c) UNDERGRADUATE EDUCATION PROGRAMS.—

4 “(1) ACTIVITIES SUPPORTED.—As part of the  
 5 activities included under the Education and Societal  
 6 Dimensions program component area, or any suc-  
 7 cessor program component area, the Program shall  
 8 support efforts to introduce nanoscale science, engi-  
 9 neering, and technology into undergraduate science  
 10 and engineering education through a variety of  
 11 interdisciplinary approaches. Activities supported  
 12 may include the following:

13 “(A) The development of courses of in-  
 14 struction or modules to existing courses.

15 “(B) Faculty professional development.

16 “(C) The acquisition of equipment and in-  
 17 strumentation suitable for undergraduate edu-  
 18 cation and research in nanotechnology.

19 “(2) AUTHORIZATION OF APPROPRIATIONS.—

20 There are authorized to be appropriated to the Di-  
 21 rector of the National Science Foundation to carry  
 22 out activities described in paragraph (1), amounts as  
 23 follows:

24 “(A) COURSE, CURRICULUM, AND LABORA-  
 25 TORY IMPROVEMENT PROGRAM.—Through the



1 Course, Curriculum, and Laboratory Improve-  
2 ment program of the National Science Founda-  
3 tion—

4 “(i) from amounts authorized under  
5 section 7002(b)(2)(B) of the America  
6 COMPETES Act (Public Law 110–69),  
7 \$5,000,000 for fiscal year 2009; and

8 “(ii) from amounts authorized under  
9 section 7002(c)(2)(B) of such Act,  
10 \$5,000,000 for fiscal year 2010.

11 “(B) ADVANCED TECHNOLOGY EDU-  
12 CATION.—Through the Advanced Technology  
13 Education program of the National Science  
14 Foundation—

15 “(i) from amounts authorized under  
16 section 7002(b)(2)(B) of the America  
17 COMPETES Act (Public Law 110–69),  
18 \$5,000,000 for fiscal year 2009; and

19 “(ii) from amounts authorized under  
20 section 7002(c)(2)(B) of such Act,  
21 \$5,000,000 for fiscal year 2010.

22 “(d) INTERAGENCY WORKING GROUP.—The Council  
23 shall establish an Education Working Group under the  
24 Nanoscale Science, Engineering, and Technology Sub-  
25 committee of the Council to coordinate, prioritize, and

1 plan the educational activities supported under the Pro-  
2 gram.

3 “(e) SOCIETAL DIMENSIONS IN NANOTECHNOLOGY  
4 EDUCATION ACTIVITIES.—Activities supported under the  
5 Education and Societal Dimensions program component  
6 area, or any successor program component area, that in-  
7 volve informal, precollege, or undergraduate  
8 nanotechnology education shall include education regard-  
9 ing the environmental, health and safety, and other soci-  
10 etal aspects of nanotechnology.

11 “(f) REMOTE ACCESS TO NANOTECHNOLOGY FACILI-  
12 TIES.—

13 “(1) IN GENERAL.—Agencies supporting  
14 nanotechnology research facilities as part of the Pro-  
15 gram shall require the entities that operate such fa-  
16 cilities to allow access via the Internet by secondary  
17 school students and teachers to instruments and  
18 equipment within such facilities for educational pur-  
19 poses and to informal science educators for science  
20 enrichment opportunities and public education pur-  
21 poses.

22 “(2) SUPPORT.—The agencies described in  
23 paragraph (1) shall support the costs associated  
24 with the provision of such access to facilities de-  
25 scribed in such paragraph.

1           “(3) WAIVER.—The agencies described in para-  
2           graph (1) may waive the requirement of paragraph  
3           (1) in cases when—

4                   “(A) use of particular facilities would be  
5           inappropriate for educational purposes; or

6                   “(B) the costs for providing the access to  
7           facilities as described in paragraph (1) would be  
8           prohibitive.

9           “(4) ESTABLISHMENT AND PUBLICATION OF  
10          PROCEDURES, GUIDELINES, AND CONDITIONS FOR  
11          USE OF FACILITIES.—The agencies identified in  
12          paragraph (1) shall require the entities that operate  
13          nanotechnology research facilities that are supported  
14          by such agencies as part of the Program to establish  
15          and publish procedures, guidelines, and conditions  
16          for the submission and approval of applications for  
17          the use of such facilities for the purpose identified  
18          in paragraph (1).

19          “(5) TECHNICAL SUPPORT.—The agencies iden-  
20          tified in paragraph (1) shall authorize personnel who  
21          operate the facilities described in such paragraph to  
22          provide necessary technical support to students and  
23          teachers who use such facilities.

1       “(g) ADVISORY PANEL REVIEW OF ENVIRON-  
 2 MENTAL, HEALTH, AND SAFETY PROGRAM COMPONENT  
 3 AREA.—

4               “(1) IN GENERAL.—The Advisory Panel shall  
 5 periodically review the funding level of the Environ-  
 6 mental, Health, and Safety program component  
 7 area, or any successor program component area, rel-  
 8 ative to the overall budget of the Program to deter-  
 9 mine whether the amount dedicated to this area is  
 10 sufficient to address the research funding needs as  
 11 estimated in the research plan required by sub-  
 12 section (b).

13               “(2) RECOMMENDATIONS.—If the Advisory  
 14 Panel determines under paragraph (1) that the  
 15 amount described in such paragraph is insufficient  
 16 or excessive, the Advisory Panel shall submit to the  
 17 Coordinator for Societal Dimensions of  
 18 Nanotechnology a recommendation for an appro-  
 19 priate level of funding for the Environmental,  
 20 Health, and Safety program component area, or any  
 21 successor program component area.”; and

22               (3) in section 4(d), by adding at the end the  
 23 following: “Such report shall include the findings of  
 24 the Advisory Panel with respect to the most recent  
 25 review required by section 10(g)(1) and any rec-

1       ommendations of the Advisory Panel under section  
2       10(g)(2).”.

3       (b)   NANOTECHNOLOGY   EDUCATION   PARTNER-  
4   SHIPS.—Section 9 of the National Science Foundation Au-  
5   thorization Act of 2002 (42 U.S.C. 1862n) is amended  
6   by adding at the end the following:

7       “(e)   NANOTECHNOLOGY   EDUCATION   PARTNER-  
8   SHIPS.—

9               “(1) ESTABLISHMENT.—

10                   “(A) IN GENERAL.—As part of the pro-  
11                   gram authorized by subsection (a), the Director  
12                   shall provide 1 or more grants under such sub-  
13                   section to establish partnerships described in  
14                   paragraph (2) of such subsection, except that  
15                   each such partnership shall include 1 or more  
16                   businesses engaged in the production of  
17                   nanoscale materials, products, or devices.

18                   “(B) DESIGNATION.—A partnership estab-  
19                   lished in accordance with subparagraph (A)  
20                   shall be designated as a ‘Nanotechnology Edu-  
21                   cation Partnership’.

22               “(2)   PURPOSE.—The   purpose   of   a  
23   Nanotechnology Education Partnership is to recruit  
24   and help prepare secondary school students to pur-  
25   sue postsecondary level courses of instruction in

1 nanotechnology and assist secondary institution and  
2 informal learning centers with outreach programs di-  
3 rected at secondary students.

4 “(3) USE OF GRANT FUNDS.—Notwithstanding  
5 subsection (a)(3), each entity receiving a grant  
6 under this subsection shall use the grant for the  
7 purposes described in paragraph (2), including to  
8 support the following:

9 “(A) Professional development activities to  
10 enable secondary school teachers to use cur-  
11 ricular materials incorporating nanotechnology  
12 and to inform teachers about career possibilities  
13 for students in nanotechnology.

14 “(B) Enrichment programs for students,  
15 including access to nanotechnology facilities and  
16 equipment at partner institutions, to increase  
17 their understanding of nanoscale science and  
18 technology and to inform them about career  
19 possibilities in nanotechnology as scientists, en-  
20 gineers, and technicians.

21 “(C) Identification of appropriate  
22 nanotechnology educational materials and incor-  
23 poration of nanotechnology into the curriculum  
24 for secondary school students at one or more

1 organizations participating in a Nanotechnology  
2 Education Partnership.

3 “(4) SELECTION OF GRANT RECIPIENTS.—  
4 Grants under this subsection shall be awarded in ac-  
5 cordance with subsection (b), except that paragraph  
6 (3)(B) of such subsection shall not apply to grants  
7 awarded under this subsection.

8 “(5) NANOTECHNOLOGY DEFINED.—In this  
9 subsection, the term ‘nanotechnology’ has the mean-  
10 ing given the term in section 15 of the 21st Century  
11 Nanotechnology Research and Development Act.”.

12 **SEC. 7. TRANSFER OF NANOTECHNOLOGY.**

13 (a) IN GENERAL.—The 21st Century  
14 Nanotechnology Research and Development Act (15  
15 U.S.C. 7501 et seq.) is amended by inserting after section  
16 10, as added by section 6(a)(2) of this Act, the following:

17 **“SEC. 11. TECHNOLOGY TRANSFER.**

18 “(a) PROTOTYPING.—

19 “(1) ACCESS TO FACILITIES.—In accordance  
20 with section 2(b)(9), the agencies supporting  
21 nanotechnology research facilities as part of the Pro-  
22 gram shall provide access to such facilities to compa-  
23 nies for the purpose of assisting the companies in  
24 the development of prototypes of nanoscale products,  
25 devices, or processes (or products, devices, or proc-

esses enabled by nanotechnology) for determining proof of concept.

“(2) PUBLICATION OF AVAILABILITY.—The agencies described in paragraph (1) shall publicize the availability of the facilities described in such paragraph and encourage their use by companies as provided for in this section.

“(3) PROCEDURES.—The agencies described in paragraph (1)—

“(A) shall establish and publish procedures, guidelines, and conditions for the submission and approval of applications for use of nanotechnology facilities;

“(B) shall publish descriptions of the capabilities of facilities available for use under this subsection, including the availability of technical support; and

“(C) may waive recovery, require full recovery, or require partial recovery of the costs associated with use of the facilities for projects under this subsection.

“(4) SELECTION AND CRITERIA.—In cases when less than full cost recovery is required pursuant to paragraph (3)(C), projects provided access to nanotechnology facilities in accordance with this sub-



1 section shall be selected through a competitive,  
2 merit-based process, and the criteria for the selec-  
3 tion of such projects shall include the following:

4 “(A) The readiness of the project for tech-  
5 nology demonstration.

6 “(B) Evidence of a commitment by the ap-  
7 plicant for further development of the project to  
8 full commercialization if the proof of concept is  
9 established by the prototype.

10 “(C) Evidence of the potential for further  
11 funding from private sector sources following  
12 the successful demonstration of proof of con-  
13 cept.

14 “(5) SPECIAL CONSIDERATION FOR PROJECTS  
15 RELEVANT TO IMPORTANT NATIONAL NEEDS.—In  
16 selecting projects under paragraph (4), the agencies  
17 described in paragraph (1) may give special consid-  
18 eration to applications that are relevant to important  
19 national needs or requirements.

20 “(b) USE OF EXISTING TECHNOLOGY TRANSFER  
21 PROGRAMS.—Each agency participating in the Program  
22 shall—

23 “(1) if the agency administers a Small Business  
24 Innovation Research Program or a Small Business  
25 Technology Transfer Program, encourage the sub-

1 mission of applications for support of  
2 nanotechnology related projects to such programs;  
3 and

4 “(2) through the National Nanotechnology Co-  
5 ordination Office established under section 3(a) and  
6 not later than 180 days after the date of the enact-  
7 ment of this section, submit to the Committee on  
8 Commerce, Science, and Transportation of the Sen-  
9 ate and the Committee on Science and Technology  
10 of the House of Representatives—

11 “(A) the plan described in section 2(c)(7);  
12 and

13 “(B) a report specifying, if the agency ad-  
14 ministers a Small Business Innovation Research  
15 Program and a Small Business Technology  
16 Transfer Program—

17 “(i) the number of proposals received  
18 for nanotechnology related projects during  
19 the current fiscal year and the previous 2  
20 fiscal years;

21 “(ii) the number of such proposals  
22 funded in each year;

23 “(iii) the total number of  
24 nanotechnology related projects funded and

1 the amount of funding provided for fiscal  
 2 year 2003 through fiscal year 2007; and

3 “(iv) a description of the projects  
 4 identified in accordance with clause (iii)  
 5 which received private sector funding be-  
 6 yond the period of phase II support of the  
 7 Small Business Innovation Research Pro-  
 8 gram and the Small Business Technology  
 9 Transfer Program.

10 “(c) INDUSTRY LIAISON GROUPS.—An objective of  
 11 the Program shall be to establish industry liaison groups  
 12 for all industry sectors that would benefit from applica-  
 13 tions of nanotechnology. The Nanomanufacturing, Indus-  
 14 try Liaison, and Innovation Working Group of the Na-  
 15 tional Science and Technology Council shall actively pur-  
 16 sue establishing such liaison groups.”.

17 (b) TECHNOLOGY INNOVATION PROGRAM SUPPORT  
 18 FOR NANOTECHNOLOGY.—Section 28 of the National In-  
 19 stitute of Standards and Technology Act (15 U.S.C. 278n)  
 20 is amended—

21 (1) in subsection (d)—

22 (A) by striking “The Director” and insert-  
 23 ing the following:

24 “(1) IN GENERAL.—The Director”; and

25 (B) by adding at the end the following:

1           “(2) SOLICITATION OF NANOTECHNOLOGY PRO-  
 2           POSALS.—The Director shall encourage the submis-  
 3           sion of proposals under paragraph (1) for support of  
 4           nanotechnology related projects.”;

5           (2) in subsection (g)—

6                   (A) by striking “The Director” and insert-  
 7           ing the following:

8           “(1) IN GENERAL.—The Director”; and

9                   (B) by adding at the end the following:

10           “(2) NANOTECHNOLOGY REPORT REQUIRE-  
 11           MENTS.—The report required by paragraph (1) shall  
 12           include a description of—

13                   “(A) how the requirement of subsection  
 14           (d)(2) is being met;

15                   “(B) the number of proposals for  
 16           nanotechnology related projects received;

17                   “(C) the number of such proposals funded;

18                   “(D) the total number of such projects  
 19           funded since the beginning of the Technology  
 20           Innovation Program; and

21                   “(E) the outcomes of such funded projects  
 22           in terms of the metrics described in paragraph  
 23           (1).”;

24           (3) in subsection (k)(3)—

1 (A) in subparagraph (C), by striking  
2 “and”; and

3 (B) by adding at the end the following:

4 “(E) advice on how to accomplish the re-  
5 quirement of subsection (d)(2); and

6 “(F) an assessment of the adequacy of the  
7 allocation of resources for nanotechnology re-  
8 lated projects supported under the Technology  
9 Innovation Program.”; and

10 (4) in subsection (l)—

11 (A) in paragraph (4)(B), by striking the  
12 “and” at the end;

13 (B) in paragraph (5), by striking the pe-  
14 riod at the end and inserting “; and”; and

15 (C) by adding at the end the following:

16 “(6) the term ‘nanotechnology’ has the meaning  
17 given the term in section 15 of the 21st Century  
18 Nanotechnology Research and Development Act.”.

19 (c) COORDINATION WITH STATE INITIATIVES.—Sec-  
20 tion 2(b)(7) of the 21st Century Nanotechnology Research  
21 and Development Act, as redesignated by section  
22 2(b)(1)(A) of this Act, is amended to read as follows:

23 “(7) ensuring United States global leadership in  
24 the development and application of nanotechnology,  
25 including through coordination and leveraging Fed-

1       eral investments with nanotechnology research, de-  
 2       velopment, and technology transition initiatives sup-  
 3       ported by the States;”.

4   **SEC. 8. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.**

5       The 21st Century Nanotechnology Research and De-  
 6       velopment Act (15 U.S.C. 7501 et seq.) is amended by  
 7       inserting after section 11, as added by section 7(a) of this  
 8       Act, the following:

9   **“SEC. 12. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.**

10       “(a) IN GENERAL.—The Program shall include sup-  
 11       port for nanotechnology research and development activi-  
 12       ties directed toward application areas that have the poten-  
 13       tial for significant contributions to national economic com-  
 14       petitiveness and for other significant societal benefits. The  
 15       activities supported shall be designed to advance the devel-  
 16       opment of research discoveries by demonstrating technical  
 17       solutions to important problems in areas such as the fol-  
 18       lowing:

19               “(1) Nano-electronics.

20               “(2) Energy production, storage, and efficiency,  
 21       including renewable energy.

22               “(3) Health care.

23               “(4) Water remediation and purification.

24               “(5) Instrumentation for nanoscale character-  
 25       ization and metrology.

1           “(6) Rapid production nanomanufacturing for  
 2           information and intelligence, including cost-effective,  
 3           green, and safe nanomaterial manufacturing meth-  
 4           ods.

5           “(7) Precision agriculture.

6           “(8) Sensors and sensor networks for defense  
 7           and homeland security.

8           “(b) RECOMMENDATIONS.—The Advisory Panel shall  
 9           make recommendations to the Program for candidate re-  
 10          search and development areas for support under this sec-  
 11          tion.

12          “(c) CHARACTERISTICS.—

13           “(1) IN GENERAL.—Research and development  
 14          activities under this section shall—

15                   “(A) include projects selected on the basis  
 16                   of applications for support through a competi-  
 17                   tive, merit-based process;

18                   “(B) involve collaborations among re-  
 19                   searchers in academic institutions and industry,  
 20                   and may involve nonprofit research institutions  
 21                   and Federal and National laboratories, as ap-  
 22                   propriate;

23                   “(C) when possible, leverage Federal in-  
 24                   vestments through collaboration with related  
 25                   State initiatives; and

1           “(D) include a plan for fostering the trans-  
2           fer of research discoveries and the results of  
3           technology demonstration activities to industry  
4           for commercial development.

5           “(2) PROCEDURES.—

6           “(A) IN GENERAL.—Determination of the  
7           requirements for applications under this sub-  
8           section, review and selection of applications for  
9           support, and subsequent funding of projects  
10          shall be carried out by a collaboration of no  
11          fewer than 2 agencies participating in the Pro-  
12          gram.

13          “(B) SPECIAL CONSIDERATION.—In select-  
14          ing applications for support, the agencies shall  
15          give special consideration to projects that in-  
16          clude cost sharing from non-Federal sources.

17          “(3) INTERDISCIPLINARY RESEARCH CEN-  
18          TERS.—Research and development activities under  
19          this section may be supported through interdiscipli-  
20          nary nanotechnology research centers, as authorized  
21          by section 2(b)(6), that are organized to investigate  
22          basic research questions and carry out technology  
23          demonstration activities in areas such as those iden-  
24          tified under subsection (b).”.



1 **SEC. 9. NANOMANUFACTURING RESEARCH.**

2 (a) IN GENERAL.—The 21st Century  
3 Nanotechnology Research and Development Act (15  
4 U.S.C. 7501 et seq.) is amended by inserting after section  
5 12, as added by section 8 of this Act, the following:

6 **“SEC. 13. NANOMANUFACTURING RESEARCH.**

7 “(a) RESEARCH AREAS.—The Nanomanufacturing  
8 component area of the Program, or any successor compo-  
9 nent area, shall include research on the following:

10 “(1) Development of instrumentation and tools  
11 required for the rapid characterization of nanoscale  
12 materials and for monitoring of nanoscale manufac-  
13 turing processes.

14 “(2) Approaches and techniques for scaling the  
15 synthesis of new nanoscale materials to achieve in-  
16 dustrial-level production rates.

17 “(3) Improvements in atomically precise meas-  
18 urement, monitoring, manipulating, and manufac-  
19 turing.

20 “(4) Development of nanotechnology production  
21 methods and tools for aerospace information and in-  
22 telligence applications.

23 “(b) GREEN NANOTECHNOLOGY.—Interdisciplinary  
24 research centers supported under the Program in accord-  
25 ance with section 2(b)(6) that are focused on  
26 nanomanufacturing research and centers established

1 under the authority of section 12(c)(3) shall include, as  
 2 part of the activities of such centers, the following:

3 “(1) Research on methods and approaches to  
 4 develop environmentally benign nanoscale products  
 5 and nanoscale manufacturing processes, taking into  
 6 consideration relevant findings and results of re-  
 7 search supported under the Environmental, Health,  
 8 and Safety program component area, or any suc-  
 9 cessor program component area.

10 “(2) Fostering the transfer of the results of  
 11 such research to industry, including through indus-  
 12 try-led collaborative translational research, with pri-  
 13 ority consideration given to proposals that provide  
 14 non-Federal funds in an amount not less than 25  
 15 percent of the total amount of any funding to be  
 16 awarded under the Program.

17 “(3) Providing for the education of scientists  
 18 and engineers through interdisciplinary studies in  
 19 the principles and techniques for the design and de-  
 20 velopment of environmentally benign nanoscale prod-  
 21 ucts and processes.”.

22 (b) REVIEW OF NANOMANUFACTURING RESEARCH  
 23 AND RESEARCH FACILITIES.—

24 (1) DEFINITIONS.—In this subsection, the  
 25 terms “nanotechnology”, “nanoscale”, “program

1 component area”, “Program”, and “Advisory Panel”  
2 have the meaning given such terms in section 15 of  
3 the 21st Century Nanotechnology Research and De-  
4 velopment Act, as redesignated by section 6(a)(1)  
5 and amended by section 13 of this Act.

6 (2) PUBLIC MEETING.—

7 (A) IN GENERAL.—Not later than 1 year  
8 after the date of the enactment of this Act, the  
9 Director of the National Nanotechnology Co-  
10 ordination Office established under section 3(a)  
11 of such Act (15 U.S.C. 7502(a)) shall sponsor  
12 a public meeting, including representation from  
13 a wide range of industries engaged in nanoscale  
14 manufacturing—

15 (i) to obtain the views of participants  
16 at the meeting on—

17 (I) the relevance and value of the  
18 research being carried out under the  
19 Nanomanufacturing program compo-  
20 nent area, or any successor program  
21 component area; and

22 (II) whether the capabilities of  
23 nanotechnology research facilities sup-  
24 ported under the Program are ade-  
25 quate—

1 (aa) to meet current and  
2 near-term requirements for the  
3 fabrication and characterization  
4 of nanoscale devices and systems;  
5 and

6 (bb) to provide access to and  
7 use of instrumentation and  
8 equipment at the facilities, by  
9 means of networking technology,  
10 to individuals who are at loca-  
11 tions remote from the facilities;  
12 and

13 (ii) to receive any recommendations  
14 on ways to strengthen the research port-  
15 folio supported under the  
16 Nanomanufacturing program component  
17 area, or any successor program component  
18 area, and on improving the capabilities of  
19 nanotechnology research facilities sup-  
20 ported under the Program.

21 (B) INVITATIONS TO PUBLIC MEETING.—

22 The Director of the National Nanotechnology  
23 Coordination Office shall invite companies that  
24 are participating in industry liaison groups to

1 participate in the meeting required by subpara-  
2 graph (A).

3 (C) REPORT ON PUBLIC MEETING.—Not  
4 later than 1 year after the date of the enact-  
5 ment of this Act, the Director of the National  
6 Nanotechnology Coordination Office shall pre-  
7 pare and submit to the Advisory Panel a report  
8 documenting the findings and recommendations  
9 of the Director with respect to the meeting re-  
10 quired by subparagraph (A).

11 (3) ADVISORY PANEL REVIEW.—

12 (A) IN GENERAL.—Not later than 18  
13 months after the date of the enactment of this  
14 Act, the Advisory Panel shall review the  
15 Nanomanufacturing program component area,  
16 or any successor program component area, and  
17 the capabilities of nanotechnology research fa-  
18 cilities supported under the Program to assess  
19 the following:

20 (i) Whether the funding for the  
21 Nanomanufacturing program component  
22 area, or any successor program component  
23 area, is adequate and receiving appropriate  
24 priority within the overall resources avail-  
25 able for the Program.

1 (ii) The relevance of the research  
2 being supported to the identified needs and  
3 requirements of industry.

4 (iii) Whether the capabilities of  
5 nanotechnology research facilities sup-  
6 ported under the Program are adequate—

7 (I) to meet current and near-  
8 term requirements for the fabrication  
9 and characterization of nanoscale de-  
10 vices and systems; and

11 (II) to provide access to and use  
12 of instrumentation and equipment at  
13 the facilities, by means of networking  
14 technology, to individuals who are at  
15 locations remote from the facilities.

16 (iv) The level of funding that would  
17 be needed to support—

18 (I) the acquisition of instrumen-  
19 tation, equipment, and networking  
20 technology sufficient to provide the  
21 capabilities at nanotechnology re-  
22 search facilities described in subpara-  
23 graph (C); and

24 (II) the operation and mainte-  
25 nance of such facilities.

1 (B) INCORPORATION OF FINDINGS FROM  
2 PUBLIC MEETING.—In carrying out the review  
3 required by subparagraph (A), the Advisory  
4 Panel shall take into consideration the findings  
5 and recommendations in the report submitted  
6 by the Director of the National Nanotechnology  
7 Coordination Office under paragraph (2)(C).

8 (C) REPORT ON ADVISORY PANEL RE-  
9 VIEW.—Not later than 18 months after the  
10 date of the enactment of this Act, the Advisory  
11 Panel shall submit to the Committee on Com-  
12 merce, Science, and Transportation of the Sen-  
13 ate and the Committee on Science and Tech-  
14 nology of the House of Representatives a report  
15 on the review required by subparagraph (A), in-  
16 cluding the following:

17 (i) The recommendations, if any, of  
18 the Advisory Panel with respect to the  
19 Nanomanufacturing program component  
20 area.

21 (ii) The report required by paragraph  
22 (2)(C).

1 **SEC. 10. NANOSCALE CHARACTERIZATION AND METROL-**  
2 **OGY.**

3 The 21st Century Nanotechnology Research and De-  
4 velopment Act (15 U.S.C. 7501 et seq.) is amended by  
5 inserting after section 13, as added by section 9(a) of this  
6 Act, the following:

7 **“SEC. 14. NANOSCALE CHARACTERIZATION AND METROL-**  
8 **OGY.**

9 “(a) RESEARCH AREAS.—The Instrument Research,  
10 Metrology, and Standards program component area, or  
11 any successor program component area, shall include re-  
12 search on translational development of instrumentation,  
13 tools, approaches, and techniques required for the charac-  
14 terization of nanoscale materials and for nanoscale metrol-  
15 ogy, including improvements in speed, accuracy, and  
16 scalability.

17 “(b) ENVIRONMENTAL, HEALTH, AND SAFETY EF-  
18 FECTS.—Interdisciplinary research centers supported  
19 under the Program in accordance with section 2(b)(6) that  
20 are focused on nanoscale characterization and metrology  
21 in accordance with section 12(c)(3) shall include as part  
22 of the activities of such centers—

23 “(1) research on methods and approaches to de-  
24 velop characterization and metrology capabilities rel-  
25 evant to the Environmental, Health, and Safety pro-



1       gram component area, or any successor program  
 2       component area; and

3               “(2) fostering the transfer of the results of such  
 4       research to industry, including through industry-led  
 5       collaborative translational research.”.

6   **SEC. 11. GAO STUDY OF NANOTECHNOLOGY RELATED**  
 7               **CODES, STANDARDS, AND REGULATIONS.**

8       (a) IN GENERAL.—Not later than 2 years after the  
 9       date of the enactment of this Act, the Comptroller General  
 10      of the United States shall conduct a study of Federal  
 11      codes, standards, and regulations as they pertain to the  
 12      safe production, use, and disposal of engineered  
 13      nanomaterials and products that embody engineered  
 14      nanomaterials.

15      (b) MATTERS COVERED.—In conducting the study  
 16      required by subsection (a), the Comptroller General  
 17      shall—

18              (1) review the current status of federal codes,  
 19      standards, and regulations of—

20                      (A) the Environmental Protection Agency;

21                      (B) the Food and Drug Administration;

22                      (C) the Department of Agriculture;

23                      (D) the Consumer Product Safety Com-  
 24      mission;

1 (E) the Occupational Safety and Health  
2 Administration; and

3 (F) any other Federal agency with regu-  
4 latory authority over the production, use, and  
5 disposal of engineered nanomaterials and prod-  
6 ucts that embody engineered nanomaterials;

7 (2) evaluate international efforts to develop  
8 codes, standards, and regulations regarding the pro-  
9 duction, use, and disposal of engineered  
10 nanomaterials and products that incorporate engi-  
11 neered nanomaterials;

12 (3) identify gaps in the ability of Federal agen-  
13 cies to enforce appropriate cost-effective safety pro-  
14 cedures for nanomaterials using the current codes,  
15 standards, and regulations of such agencies; and

16 (4) develop recommendations with respect to  
17 changes to such codes, standards, and regulations to  
18 remedy such gaps.

19 (c) REPORT.—Not later than 2 years after the date  
20 of the enactment of this Act, the Comptroller shall submit  
21 to the Committee on Commerce, Science, and Transpor-  
22 tation of the Senate, the Committee on Science and Tech-  
23 nology of the House of Representatives, and other appro-  
24 priate committees of Congress, a report on the study re-

1 quired by subsection (a), including a description of the  
2 matters covered under subsection (b).

3 **SEC. 12. PUBLIC OUTREACH.**

4 (a) NATIONAL DISCUSSION CONVENED.—Not later  
5 than 1 year after the date of the enactment of this Act,  
6 the Director of the National Nanotechnology Coordination  
7 Office, established under section 3(a) of the 21st Century  
8 Nanotechnology Research and Development Act (15  
9 U.S.C. 7502(a)), shall convene a national discussion to en-  
10 gage the people of the United States and increase their  
11 awareness of nanotechnology.

12 (b) FORM.—The Director shall convene the national  
13 discussion required by subsection (a) through not less  
14 than 2 large-scale deliberative forums.

15 (c) PARTICIPATION.—In the national discussion re-  
16 quired by subsection (a), the Director shall ensure that  
17 the population of participants is diverse in—

- 18 (1) age;
- 19 (2) geography;
- 20 (3) income; and
- 21 (4) education.

22 (d) INCORPORATION OF VIEWS.—In the national dis-  
23 cussion required by subsection (a), the Director shall in-  
24 corporate the views and positions of key stakeholder  
25 groups, including representatives of—

- 1 (1) academia;
- 2 (2) nongovernmental organizations; and
- 3 (3) industry.

4 (e) IDENTIFICATION OF PRIORITIES AND CON-  
5 CERNS.—In the national discussion required by subsection  
6 (a), the Director shall identify the collective priorities and  
7 concerns of the general public and stakeholder groups that  
8 relate to—

- 9 (1) nanotechnology products;
- 10 (2) research and development; and
- 11 (3) regulatory policy.

12 (f) REPORT.—Not later than 1 year after the date  
13 of the enactment of this Act, the Director shall submit  
14 to the Committee on Commerce, Science, and Transpor-  
15 tation of the Senate and the Committee on Science and  
16 Technology of the House of Representatives a report sum-  
17 marizing the national discussion required by subsection  
18 (a).

19 (g) AUTHORIZATION OF APPROPRIATIONS.—

20 (1) IN GENERAL.—There are authorized to be  
21 appropriated to the Director of the National  
22 Nanotechnology Coordination Office \$2,000,000 to  
23 carry out the national discussion required by sub-  
24 section (a).

1           (2) SUPPLEMENT NOT SUPPLANT.—The  
 2           amount authorized to be appropriated by paragraph  
 3           (1) for the purpose described in that paragraph is  
 4           in addition to amounts provided in support of the  
 5           operation of the National Nanotechnology Coordina-  
 6           tion Office under section 3(b) of the 21st Century  
 7           Nanotechnology Research and Development Act (15  
 8           U.S.C. 7502(b)), as amended by section 2(b)(1) of  
 9           this Act.

10 **SEC. 13. AMENDMENTS TO DEFINITIONS.**

11           Section 15 of the 21st Century Nanotechnology Re-  
 12           search and Development Act, as redesignated by section  
 13           6(a)(1) of this Act, is amended—

14           (1) in paragraph (2)—

15                   (A) by striking “atomic, molecular, and  
 16                   supramolecular levels” and inserting  
 17                   “nanoscale”; and

18                   (B) by striking “molecular organization,  
 19                   properties, and” and inserting “properties or”;  
 20                   and

21           (2) by adding at the end the following:

22                   “(7) NANOSCALE.—The term ‘nanoscale’ means  
 23                   one or more dimensions of between approximately 1  
 24                   and 100 nanometers.”.

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